CALIFORNIA DIVISION OF MINES AND GEOLOGY

Fault Evaluation Report FER-52

September 20, 1977

1. Name of fault: Northridge Hills

2. Location of fault: Santa Susana, Oat Mountain, Canoga Park, and Van Nuys 7.5 minute quadrangle, Los Angeles and Ventura Counties (see figure 1).

3. Reason for evaluation: Part of a 10-year program.

4. List of references:

a) Barnhart, J.T., and Slosson, J.E., 1973, The Northridge Hills and associated faults -- a zone of high seismic probability? in Geology, seismicity, and environmental impact: Association of Engineering Geologists, Special Publication, p. 253-256.

b) Bonilla, M.G., Buchanan, J.M., Castle, R.O., Clark, M.M., Frizzell, V.A., Gulliver, R.M., Miller, F.K., Pinkerton, J.P., Ross, D.C., Sharp, R.V., Yerkes, R.F., and Ziony, J.I., 1971, Surface faulting in the San Fernando, California, earthquake of February 9, 1971: U.S. Geological Survey Professional Paper 733, p. 55-76.

c) California State Water Rights Board, 1962, The City of Los Angeles vs. City of San Fernando: California State Water Rights Board, Report of Referee, no. 650079, v. 1 and 2.

d) Jennings, C.W., 1975, Fault map of California with locations of volcanoes, thermal springs and thermal wells: California Division of Mines and Geology, California Geologic Data Map Series, Map no. 1, scale 1:750,000.

e) Saul, R.B., 1977, Personal communication.

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FIGURE 1. General location of the Northridge Hills fault (Jennings, 1975, scale 1:750,000)

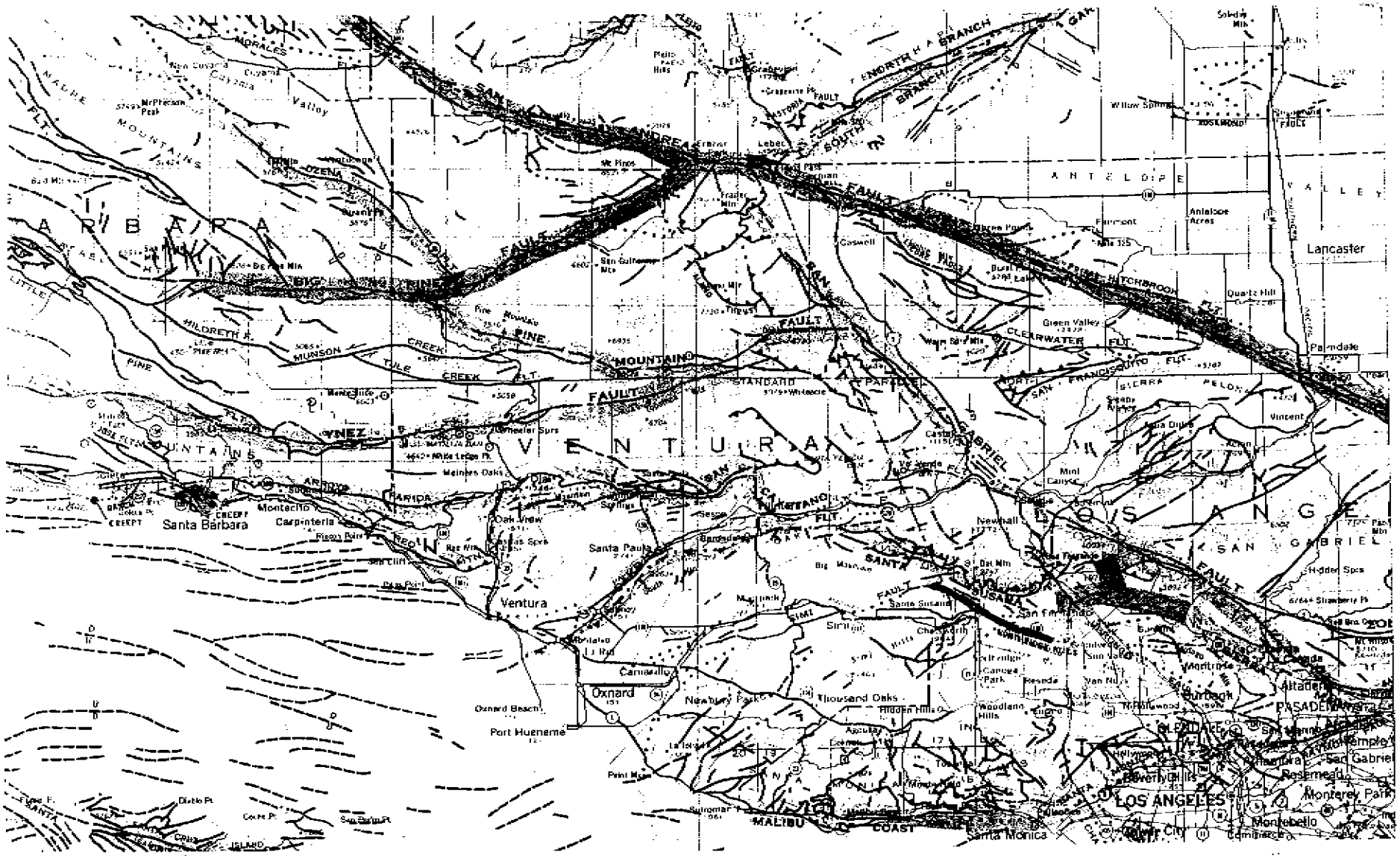

Figure 2. (from Bernhardt and Slosson, 1973).

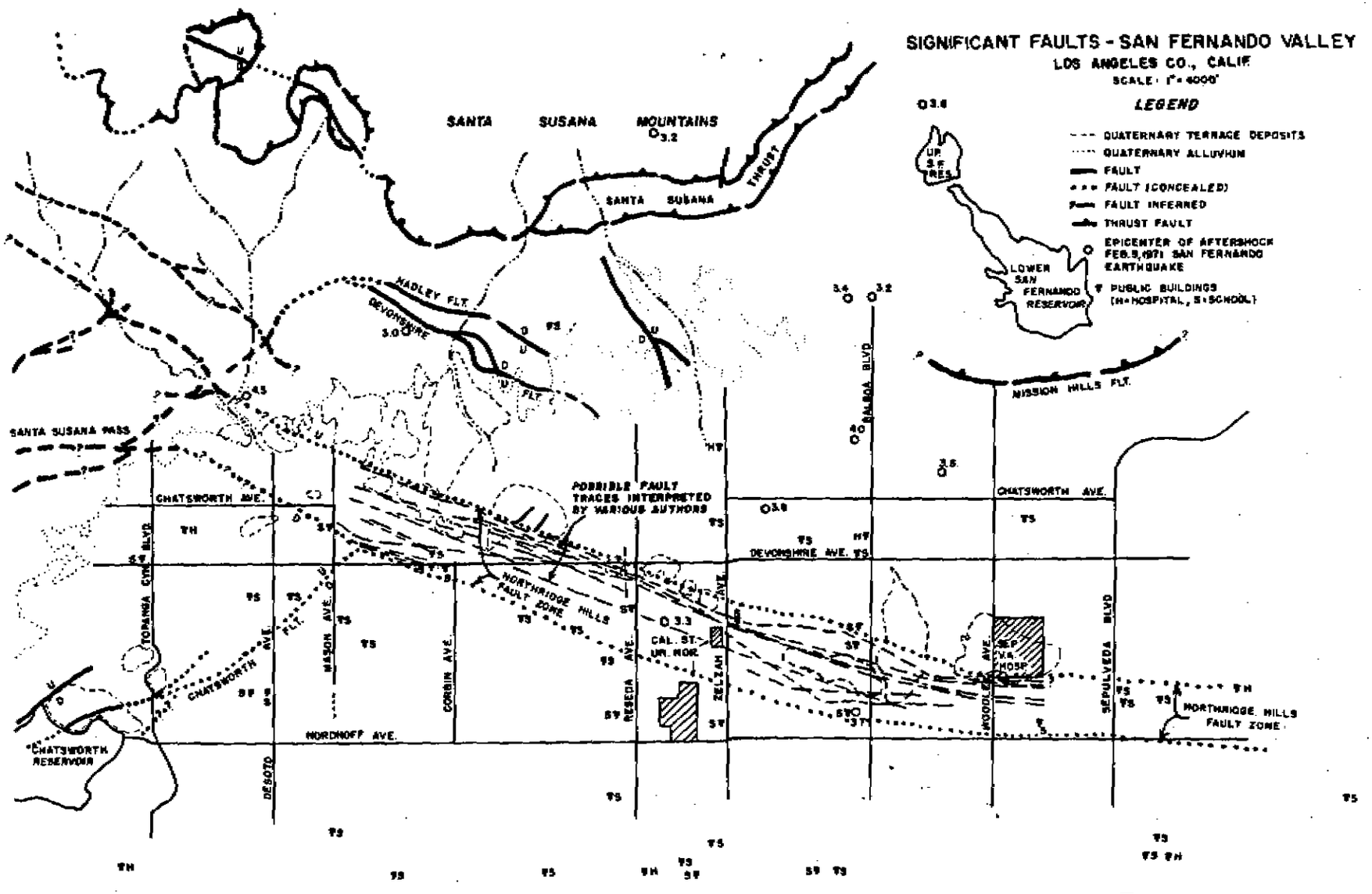

FIGURE 1. Structural pattern and significant faults, San Fernando Valley, California.

f) Wentworth, C.M., Bonilla, M.G., and Buchanan, J.M., 1969, Seismic environment of the Burro Flats site, Ventura County, California: U.S. Geological Survey open-file report 1973, 35 p., 2 figures, map scale 1:24,000.

g) Wentworth, C.M., and Yerkes, R.F., 1971, Geologic setting and activity of faults in the San Fernando area, California in The San Fernando, California, earthquake of February 9, 1971: U.S. Geological Survey Professional Paper 733, p. 6-16.

h) Woodward, McNeil and Associates (in press), Seismic zoning map (cited in Barnhardt, J.T., and Slosson, J.E., 1973, The Northridge Hills and associated faults -- a zone of high seismic probability? in Geology, seismicity, and environmental impact: Association of Engineering Geologists, Special Publication, p. 253-256).

i) Ziony, J.I., Wentworth, C.M., Buchanan-Banks, J.M., and Wagner, H.C., 1974, Preliminary map showing recency of faulting in coastal southern California: U.S. Geological Survey, Miscellaneous Field Studies Map MF-585, 15 p., map scale 1:250,000, 3 plates.

5. Summary of available data:

There is some confusion in the literature regarding the Northridge Hills fault. Most authors believe the fault is a dip-slip fault; some describe it as north block up (Barnhardt and Slosson, 1973, p. 253; California State Water Rights Board, 1962, cross section) and some described it as south block up (Wentworth, et al., 1969; and California State Water Rights Board, 1962, p. 24-25). The fault is steeply dipping,

from 80° N to vertical (Barnhardt and Slosson, 1973, p. 253). Most authors believe the fault to be late Quaternary in age (Ziony, et al., 1974; Barnhardt and Slosson, 1973, p. 253; Wentworth, et al., 1969, p. 15; Wentworth and Yerkes, 1971, p. 14; California State Water Rights Board, 1962, geologic map) based on ground-water barriers and inferred displacements of late Quaternary terrace deposits.

Barnhardt and Slosson (1973, p. 253) note: "The Northridge Hills fault is believed to be more than one fault plane, or splintering faults, which align and possibly blend with the fault complex in Santa Susana Pass and the Simi Valley to the west. Near the town of Northridge, the Northridge Hills fault is buried beneath alluvium and locations are interpreted from oil company data and from topographic patterns." Wentworth and Yerkes (1971, p. 14) noted that although the eastern extent of the Northridge Hills fault is unknown, topographic expression which may be due to the fault is present to the middle of the San Fernando Valley (also noted by Ziony, et al., 1974). Wentworth and Yerkes also concluded that the base of alluvium is displaced 300 feet, down on the southwest side; and, Barnhardt and Slosson (1973, p. 255), Wentworth, et al. (1969, p. 15), and California State Water Rights Board (1962, p. 24-25) all note that the Modelo Formation is displaced by from 500 to 1000 feet vertically.

Barnhardt and Slosson (1973, p. 255) cite seven significant aftershocks of the 1971 San Fernando event which were within 2± miles of the Northridge Hills fault. They also state, "Personnel with Woodward, McNeil and Associates suggest that a zone 2000 feet wide (along the Northridge Hills fault) could be subject to future ground rupture." Bonilla, et al. (1971, p. 75) noted that the Northridge Hills fault was field checked after the 1971 event and no evidence of movement or

cracks related to fault movement were noted.

6. Interpretation of air photos: Not attempted.

7. Field observations: Not attempted.

8. Conclusions:

The Northridge Hills fault is most probably a late Quaternary fault along which some dip-slip movement has occurred. It is most probable that the fault movement is up relatively on the north, and thus may be related to the San Fernando and/or Santa Susana faults, although such may be disputed. There is no available evidence to support or deny a strike-slip component of faulting. Neither Holocene activity nor inactivity can be conclusively demonstrated.

The fault is probably poorly defined since 1) the fault is noted as buried under alluvium, and 2) Woodward, McNeil and Associates concluded that a zone 2,000 feet wide might be subject to ground rupture. Saul (1977) has stated that the fault could be found at the surface in a few select locations, but that many of these sites have been developed and the evidence obliterated or obscured.

Thus, the fault does not appear to be sufficiently active and may not be sufficiently well-defined.

9. Recommendations:

Under the present project guidelines, zoning of the Northridge Hills fault is not recommended at this time. Further work could be done, but it is doubtful whether more definitive data which would enable the fault to be zoned could be found given the present limits on the project.

10. Investigating geologist's name; date:

I agree with recommendations re zoning. Saul's report should be reviewed when it becomes available. I warranted a supplementary should be written.
EWH
10/17/77
FER

THEODORE C. SMITH
Assistant Geologist
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